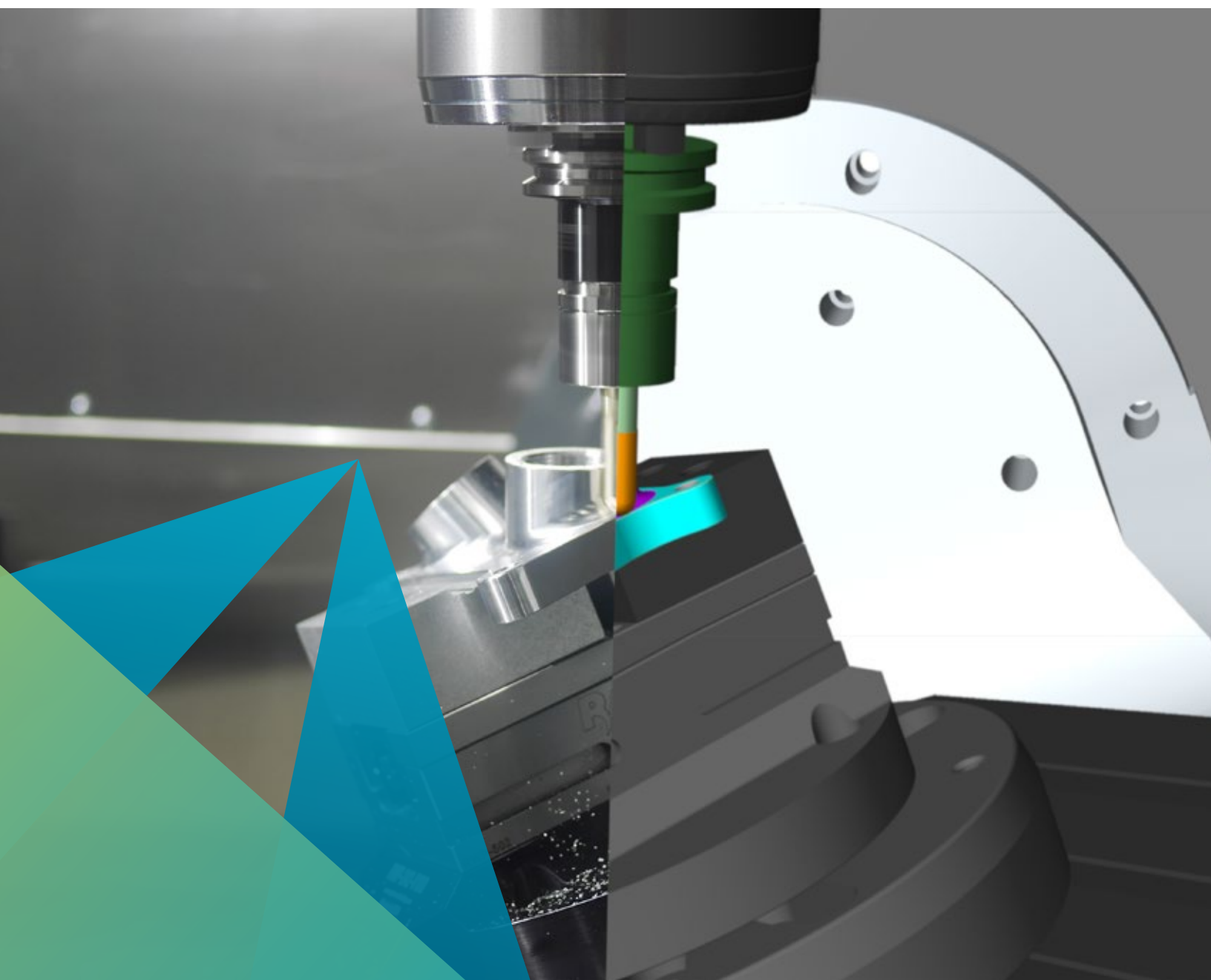



## **NCSIMUL**

Your comprehensive G-code verification software for smart  
CNC machining



A man in a blue tank top and green shorts is running on a path. To his right is a digital wireframe twin of his body, composed of blue lines and dots, set against a dark blue background with a green diagonal overlay on the left.

Life is better with a twin.  
NCSIMUL simulates any  
type of CNC machine  
for a complete virtual  
build of your real-life  
machining environment.

# Smart CNC Simulation Software

## Discover the potential of a digital twin

Do your goals include increasing productivity, while reducing shopfloor costs with optimized and automated digital processes, including flexible and collision-free machining?

NCSIMUL combines the digital advancements of “Industry 4.0” with the real-life demands of CNC machining in a way that is both practical and user friendly.

Because of this, NCSIMUL is so much more than just G-code verification software. It provides a digital platform where it is possible to manage your CNC programs across the entire shop floor.

NCSIMUL is deployed by global OEMs, small and medium-sized companies and suppliers worldwide across multiple different industries, including the mechanical engineering, automotive, aerospace, defense, transportation, energy and medical technology sectors.



**We no longer have to buy an additional back-up piece of material, so it saves us money there, as well as time, and gives us complete peace of mind.”**

**Marton Precision Manufacturing**

# A comprehensive solution

## With an innovative and seamless process

NCSIMUL enables collision-free and flexible CNC machining with automated processes to maximize your shopfloor productivity.

Based on virtual machines that are digital twins of your real machines, your NC programs are validated in advance for possible errors and collisions, and can be automatically converted for use on different machine types and controls, effectively reducing dry runs and programming times.

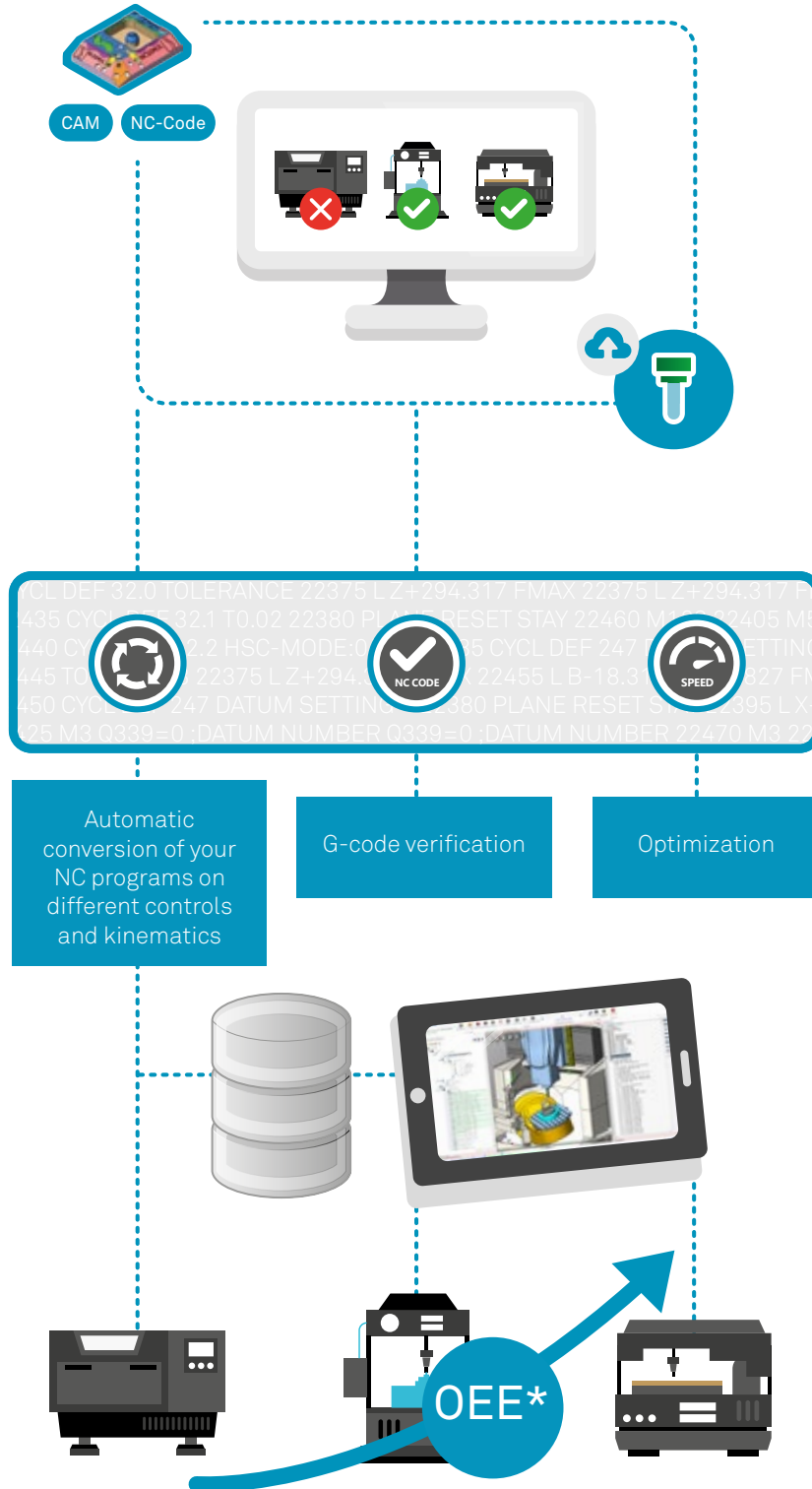
Your team benefits from continuously updated data in a seamless workflow.



This unique concept has already won several prestigious technology and innovation awards.

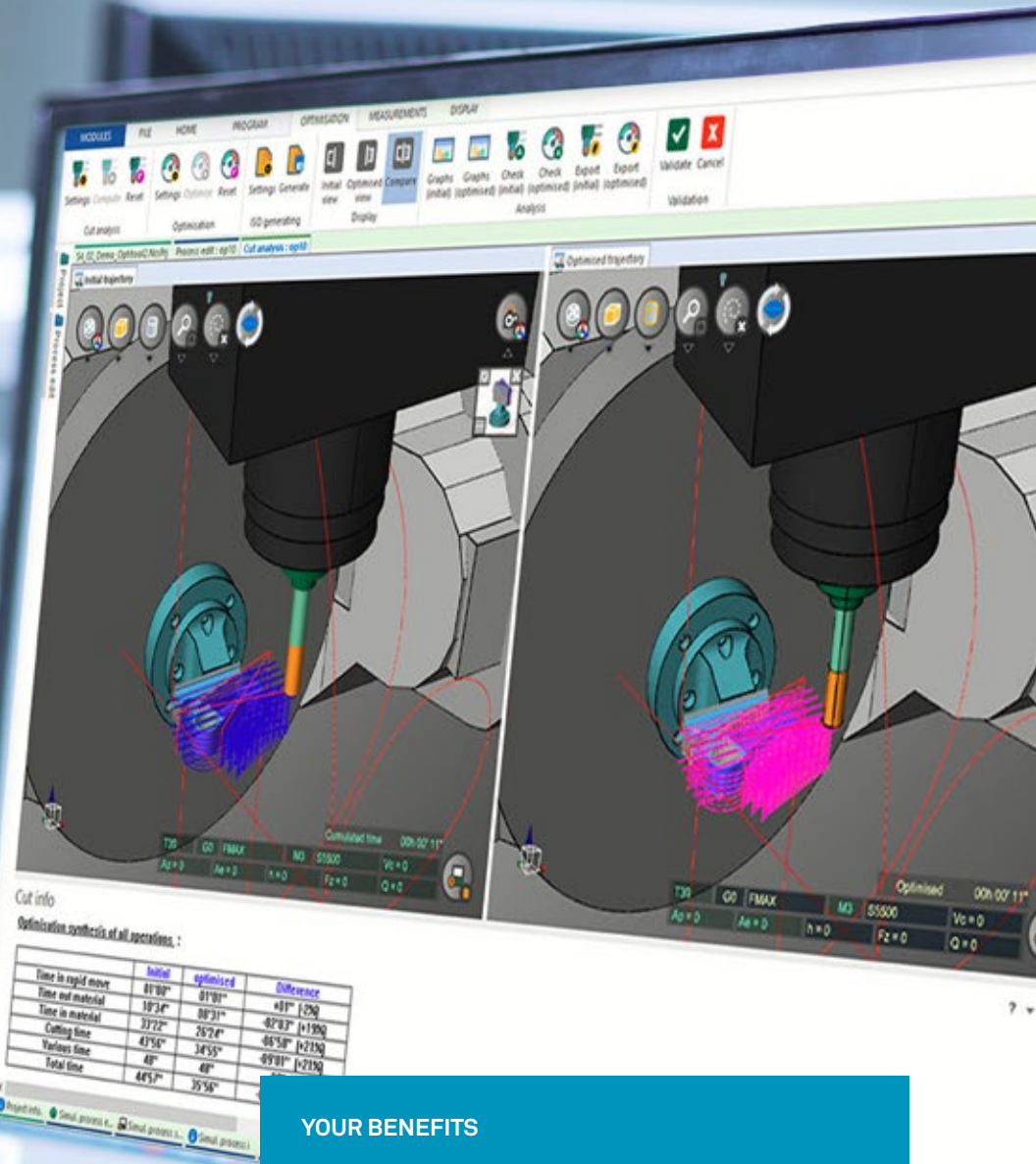
**NCSIMUL is a modular-built solution that can be perfectly adapted to your needs:**

- Accurate G-code simulation
- Optimization of machining times
- Interoperability with existing CAM
- Real-time monitoring
- Digital documentation



\* OVERALL EQUIPMENT EFFECTIVENESS





## YOUR BENEFITS

### Avoid crashes and collisions

- Safe and collision-free machining
- No tool, head or spindle breakage
- No need for prove outs on the machine
- Increased safety for machine operators

### Speed up your part production

- Reduced set-up time
- Avoidance of CNC downtime due to errors
- Prove out G-code on your computer before machining
- Optimized production processes

### Optimized resources and machining results

- Reduced scrapped parts
- Confidently run your machines unattended

# NCSIMUL Machine

## Your high-speed 3D NC simulation

Do you aim to increase the efficiency of your machinery and digitize your shop floor? Do you want to run your machines without any risk of collision and optimize your production costs and efficiency?

Our G-code simulation verifies your toolpath, ensuring that you work with collision-free NC programs that account for part clamping, indexing and starting movements. After CAM post-processing the software reads the final machine code, guaranteeing that you work with a crash-free part program while on the real machine.

The assurance of accurate toolpaths streamlines programming during the day and makes it possible for you to confidently perform unattended batch production during the night.

### **NCSIMUL machine simulation accounts for all of your machine's parameters, including:**

- Initial positioning of the part on the table
- Clamp addition/removal during machining
- Part rotation/translation between two programs
- Manual tool mounting
- Operator data input
- Command validation
- G & M-codes logic
- Tool compensation (diameter, length)
- NC controller logic
- Calculation of cycle times (block by block or cumulatively)
- Machine kinematics and limits
- Maximum feed rate and the direction of each axis
- Spindle torque
- Axis acceleration/deceleration.

### **No machine is too complex.**

#### **Easily integrated**

NCSIMUL is connected to the main CAM and Tooling Data systems available on the market, ensuring it will integrate seamlessly with your existing software process.

### **G-code validation in 3 steps - without the time loss and iterations**

- **High performance G-code verification**

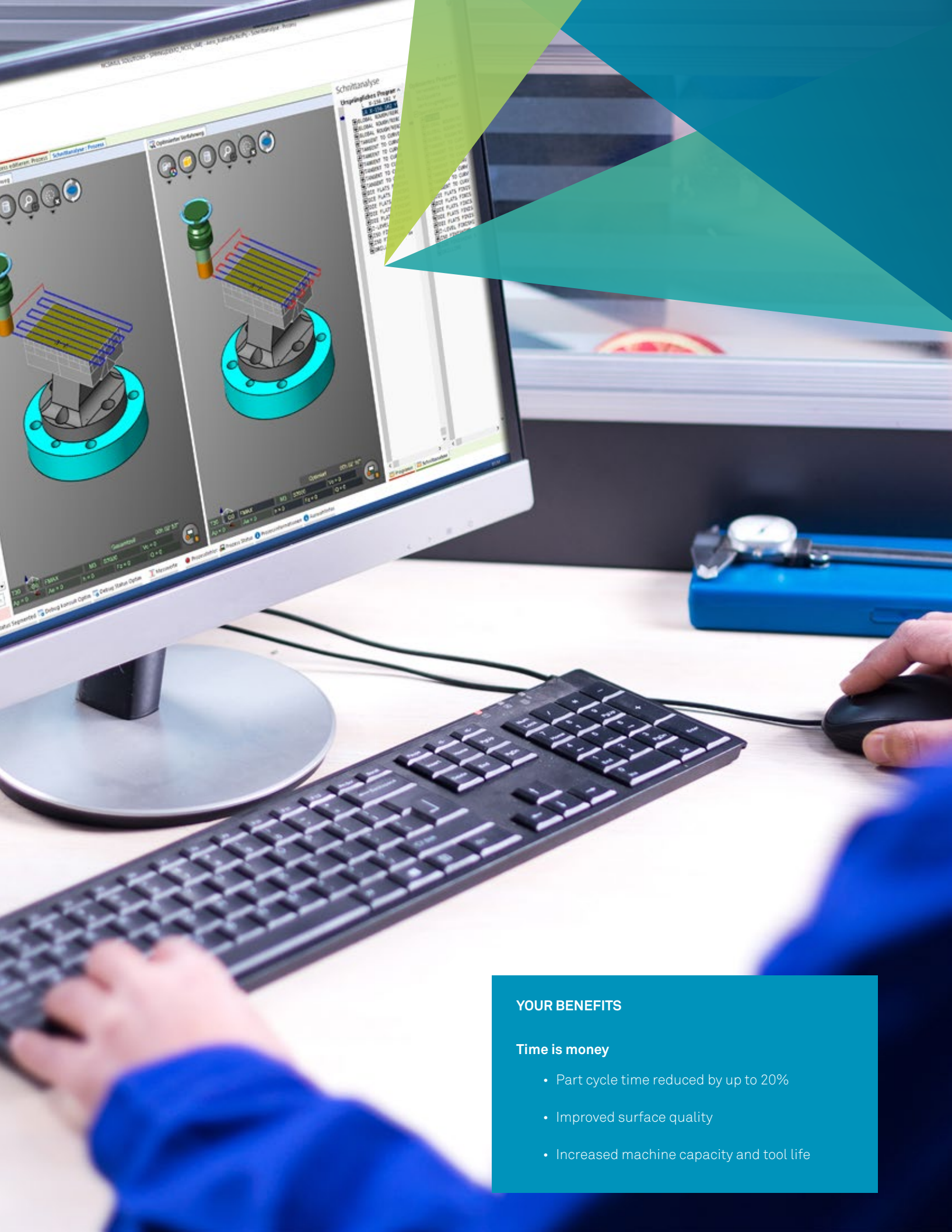
Including G-code decoding, full-program verification, interactive toolpath simulation, automatic error detection, and accurate cycle-time estimates.

- **Motion simulation**

Enjoy realistic simulation and material removal with detection of machining errors/collisions (rapid/spindle stopped in material, clipped part set-up, etc.) and the use of probing macros.

- **Part inspection**

Compare with your design model. Gauged/excess material is displayed with tolerance deviations. Dynamic 3D section planes for further analysis and measurements of thickness, distance drilling, etc are available.



## YOUR BENEFITS

### Time is money

- Part cycle time reduced by up to 20%
- Improved surface quality
- Increased machine capacity and tool life



# NCSIMUL Optitool

## Powerful optimization of your CNC machining times

Do you aim to produce more parts in less time and ensure your new parts are programmed in the most efficient way? Would you like to save on a new machine purchase by making the most of the machine you already own?

With our smart optimization module, you can reduce your part cycle-time, by removing unnecessary slow tool movements, while keeping your part safe from collisions.

NCSIMUL Optitool will drive you through a 3-step process, making your program optimization logical and intuitive. The first step is analyzing the original tool cutting conditions, the second is choosing your optimization strategy and last is re-writing the program.

While choosing a simple, yet efficient, air cutting optimization strategy, Optitool users are reducing their machining cycle time by 20% or more. One step further is optimizing tool feed rates in material by maintaining a constant chip flow or chip thickness while keeping the feed per tooth under control.

With Optipower, the optimization is integrating the maximum power in the parameters, regulating the spindle power and torque required for a specific program in a given material to avoid tool breakage and premature wear.

As a result, you will benefit from improved surface quality, as well as increased tool life.

### **Detailed analysis of your cutting conditions**

A detailed report of the tool cutting conditions is provided in a comprehensive way, linked to the current block of code and displaying the active material removal. While you segment the toolpath and analyze maximum values for all cutting parameters, alerts will keep you informed when parameter limits have been exceeded.

### **Remove air cutting**

Choose the best approach and retract motion strategies to minimize air cutting. Reduce working feed rate motions (G1) and maximize rapid motions (G0) safely throughout the NC program.

### **Optimize material removal**

Generate new feed rates according to the removed material analysis and achieve better surface finish by maintaining a constant chip load or chip thickness. An automatic "Learning Mode", which requires no setup or know-how, will assist you.

### **Direct "before and after" comparison**

You can graphically track changes at a glance, see results and benefit from the automatically generated data analysis.

You can also use automatically updated technology data for future edits, via the tool library.

The performance data of the machine is also considered and traverse motions in the machine switches are automatically adjusted.

### **Work with NCSIMUL Automation**

- Maximize the use of NCSIMUL Machine licenses, run your simulation 24h/24 and 7d/7 on servers
- Run the cutting conditions analysis and the air cut optimization automatically
- Implement customer rules in the automation process, all optimization uses the same parameters.



## YOUR BENEFITS

### Maximize your production capacities

- Reduce re-programming time between machines from days to hours
- Use new machines earlier in production
- Flexible production: react faster to short term changes

# NCSIMUL 4CAM

## Automatic conversion of your CNC programs

Is one of your biggest challenges to production being able to react quickly to short-term resource changes and customer orders? Do you want to make the most of your machining capacities and reduce production costs? Would you like to quickly switch machines, kinematics and controls, without time-consuming manual reprogramming?

NCSIMUL 4CAM is the solution that allows you to do all of this. It automatically converts your CAM and NC programs for compatibility with different machine tools and controls and includes G-code verification.

Not only will you be able to switch between your machines in order to increase your overall equipment effectiveness (OEE), but you will also be able to put new machines into operation more quickly by using your existing NC programs. As part of supplier management, the final NC programs can be shared as encrypted data to effectively protect intellectual property.

## Master these situations faster and in a more flexible way

### Short-term changes in production resources

When the machinery you planned to use is no longer available, simply select a different machine tool to maximize your entire shop-floor capacity.

### Split your programs on different machines

Take advantage of alternative splitting and combination options to manage your production capacity more effectively.

### Multi-part production

Perform unattended high-volume production on nights and weekends.

### Get your machines up and running faster

Quickly make use of new machinery by converting existing NC programs to use on the new equipment.

### Automatically convert your NC programs

The software reads APT/CL data from different CAM systems or data migrated from existing NC programs to another machine with different kinematics, controls and technology data.

### Choose any available machine for the job

- Integrated G-code simulation during machine switch: Verification of the G-code, taking into account tool holders and part set-up.
- Includes air cutting optimization, feed rate and cutting analysis
- “Last-minute” machine changes with just a few clicks

### Dynamic remaining material management

Benefit from realistic rest stock for processing new operations, simulating the full part machining and exporting the final cuts towards 3D CAD systems.

NCSIMUL makes it easy to view material remaining after roughing operations and evaluate regions that require additional machining. Even with 5-axis processing the residual material is saved for a quick view for the machine operator. Your model will always be up to date.



## YOUR BENEFITS

- Real-time access for all team members involved in the manufacturing process
- Reduction of errors and misunderstandings in collaboration
- Paper-free work environment





# Digital documentation

## Interactive collaboration based on updated data at any time

Do you want to digitally manage your technical documents for the CNC machining production, avoiding errors and optimizing the program service and production collaboration?

Effective collaboration requires real-time access for all team members involved in the manufacturing process to eliminate misinterpretations based on out-of-date or redundant data. With NCSIMUL, team members can collaborate using guaranteed up to date data from the final programming step.

### **Automatic Documentation NCDoc**

From the G-code verification, generate cutting tool and part setup sheets, control and time reports, automatically in a few clicks. Based on configurable templates, production document creation becomes easy, consistent and fast, freeing up the programmer's time from this tedious task.

From intermediate stocks or result stock generate "Auto control inspection sheets". These are controls performed by the machine tool operator to validate the settings of tool compensations and work offsets before doing the serial of parts.

For each measurement, you can define the tolerances in + or - and the device to use to do the measurement. A check function displays the finishing tools you need to control, you will need at least one measurement per cutting portion (bottom, corner radius, side).

### **Simulation viewer NC Player:**

3D NC movies can be played and shared in the player - even on mobile devices. The digitization of CNC production does not end at the factory gate: the NC films can also be shared with your suppliers, which enables networking of production beyond company boundaries.





## YOUR BENEFITS

- Real-time monitoring of your machine status
- Better overview of machine utilization and production efficiency
- Optimized use of your shopfloor assets



# NCSIMUL DNC and Monitor

## Machine monitoring in real time

### **Collaborate interactively in real time with operators, customers & suppliers in your virtual machine environment.**

Do you want to see your machine productivity in real-time, helping you to better plan and optimize your shop floor?

Benefit from a reliable DNC system, by tracing your CNC program life-cycle on the shop floor, acquiring program changes and managing program revisions through an automatic approval process.

Get live information about your CNC machine status, production loads and make the right decision when necessary to adapt to changes in the manufacturing process. Generate technical data sheets to communicate with the shop floor and automatically share 3D videos.

The automatic generation of reports, for example, based on overall equipment effectiveness (OEE) key figures, provides you with a perfect overview of your productivity for analyzing the efficiency of your manufacturing processes.



Hexagon is a global leader in sensor, software and autonomous solutions. We are putting data to work to boost efficiency, productivity, and quality across industrial, manufacturing, infrastructure, safety, and mobility applications.

Our technologies are shaping urban and production ecosystems to become increasingly connected and autonomous – ensuring a scalable, sustainable future.

Hexagon's Manufacturing Intelligence division provides solutions that utilise data from design and engineering, production and metrology to make manufacturing smarter. For more information, visit [hexagonmi.com](https://hexagonmi.com).

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